

CLAIMS

The invention claimed is:

1. A method of managing medical images comprising:
 - receiving a plurality of medical images created by a plurality of
 - 5 medical imaging devices each of which processes the medical images using a unique image format; and
 - converting the medical images to a common image format, suitable for display on a computer screen.
- 10 2. The method of claim 1, comprising storing the converted images in an image database.
- 15 3. The method of claim 2, comprising posting the converted images for access via a client computer, including generating browser compatible pages.
- 20 4. The method of claim 3, wherein posting the images comprises embedding image tags in the browser compatible pages, wherein the image tags point to the converted images.
- 25 5. The method of claim 1, comprising posting the converted images for access via standard Internet procedures on a client computer having standard browser capability.
6. The method of claim 1, comprising displaying at least one of the converted images on a client computer in response to a user request.

7. The method of claim 1, wherein receiving the plurality of medical images comprises transferring the images from a plurality of scanners.

8. The method of claim 1, wherein receiving the plurality of medical
5 images comprises transferring the images from a computer readable
medium.

9. The method of claim 1, comprising notifying a user via automatic electronic messaging that the images are accessible for display on a client computer.
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10. The method of claim 1, comprising storing the images as pixel values according to a predetermined standard Internet compatible process.

15 11. The method of claim 10, comprising adjusting brightness and
contrast.

12. The method of claim 11, comprising cropping the images.

20 13. A medical image database comprising:
a first medical image generated using a first imaging format;
and

a second medical image generated using a second imaging format, wherein the second imaging format is different from the first imaging format.

14. The database of claim 13, wherein the first and second medical images have been converted to a common browser compatible image format and are stored in the database in the common browser image format.

5 15. The database of claim 13, wherein: the first medical image is generated from a first scanner manufactured by a first manufacturer; and the second medical image is generated from a second scanner manufactured by a second manufacturer.

10 16. The database of claim 13, wherein:
the first medical image corresponds to a first modality; and
the second medical image corresponds to a second modality.

15 17. The database of claim 16, wherein the first and second modalities are selected from the group consisting of: magnetic resonance imaging; echocardiographic imaging; nuclear scintigraphic imaging; positron emission tomography; electrocardiographic data; and x-ray imaging.

20 18. A medical image database comprising images corresponding to a plurality of different modalities, wherein the database is organized in a hierarchical data structure, comprising:
a patient identifier parameter; and
an image modality identifier parameter associated with at least
25 one of the plurality of modalities wherein the patient identifier parameter is at a higher level in the hierarchical data structure than the image modality identifier parameter.

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19. A medical image database comprising images corresponding to a plurality of different modalities, wherein the database is organized in a hierarchical data structure comprising:

5 an image modality identifier parameter associated with each of the plurality of modalities; and

 an examination date identifier parameter wherein the examination date identifier parameter is at a lower level in the hierarchical data structure than the modality identifier parameter.

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20. A medical imaging database comprising:

 a plurality of images representing a plurality of different modality scans;

 an image modality identifier parameter associated with each of

15 the plurality of images;

 an examination date identifier parameter associated with each of the plurality of images; and

 a patient identifier parameter associated with each of the plurality of images.

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21. The database of claim 20, wherein each image is stored in a common image format, and wherein the common image format is browser compatible.

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22. A method of managing medical images comprising:

 in response to a user request, pulling images from a scanner;

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converting the pulled images to a common image format compatible for display at a computer; and

posting the converted images to a database for subsequent display at a client computer in response to a second user request.

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23. The method of claim 22, comprising notifying the user by automatic electronic messaging when the images are posted, whereby the users may view the images at a client computer.

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24. A method of managing medical images comprising:
receiving a plurality of images corresponding to a plurality of modalities; and
displaying to a user at a client computer a selection comprising images associated with at least two different modalities.

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25. The method of claim 24, comprising, in response to the user selection, simultaneously displaying at the client computer images corresponding to at least two different modalities.

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26. The method of claim 25, comprising displaying the images corresponding to the two modalities side-by-side.

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27. A method of managing medical images comprising:
storing in a database medical images converted to a browser compatible format, wherein the images correspond to at least two different examination times;

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displaying at a client computer a selection of images associated with at least two different times; and

in response to a user request, displaying at the client computer the images corresponding to at least one of the two different examination

5 times.

28. A method of managing medical images comprising:

in response to a request from a first user at a first client computer at a first location, displaying a medical image; and

10 simultaneously displaying on a screen the medical image to a second user at a second location.

29. The method of claim 28, wherein displaying the medical image to the second user comprises displaying the medical image on a second client computer, wherein the first and second client computers are connected via a distributed network.

30. A method of managing medical images comprising:

converting a medical image to a common browser compatible

20 image format; and

posting the medical image in a database accessible via a client computer, whereby a user may view the images via a client computer.

31. The method of claim 30, comprising, in response to a request from a user at a client computer, notifying the user when one of the converted images is accessible for viewing.

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32. The method of claim 31, wherein notifying the user comprises transmitting an electronic message to a location determined by the user.

33. A medical imaging management system for use in a client-server environment, the system comprising:

a transfer engine for receiving image data in a plurality of image formats;

a conversion engine coupled to the transfer engine for converting the image data to a common browser compatible format; and

10 a post engine coupled to the conversion engine for generating
browser compatible pages for displaying the images on a client computer.

34. The system of claim 33, wherein the post engine is adapted to generate html pages containing image tags pointing to the converted images.

35. The system of claim 33, comprising an image database coupled to the post engine, wherein the image database comprises images from a plurality of modalities.

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36. A method of managing medical images comprising:

linking a first scanner for a first modality and a second scanner for a second modality to a transfer engine via a distributed network;

transferring medical images from the first and second scanners
25 to the transfer engine; and

converting the medical images to a common browser compatible format

37. A method of managing medical images comprising:
transferring medical images from a first scanner for a first
modality to an image database; and
5 transferring medical images from a second scanner for a
second modality to the image database.

38. The method of claim 37, wherein transferring the medical
images comprises converting the medical images to a common browser
10 compatible image format.

39. The method of claim 37, comprising displaying on a web page
at a client computer a selection comprising images corresponding to the
first modality and images corresponding to the second modality.

15 40. The method of claim 37, comprising selecting an image from
the image database in response to a user request and displaying the image
to the user at a client computer.

20 41. A method of managing medical images comprising:
converting a medical image data to Internet browser compatible
format;
determining a region of diagnostic interest of the medical
image; and
25 adjusting image quality of the medical image based upon the
region of diagnostic interest.

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42. The method of claim 41, wherein the medical image comprises a series of movie frames and adjusting the image quality comprises searching each movie frame for a brightest pixel.

5 43. The method of claim 42, comprising scaling each movie frame such that the brightest pixel is scaled to a maximum brightness level of a standard Internet compatible format.

44. The method of claim 41, comprising pulling at least two
10 medical images, including the medical image, from at least two scanners.

45. The method of claim 44, wherein the at least two scanners are manufactured by at least two manufacturers.

15 46. The method of claim 44, wherein the at least two scanners generate images corresponding to at least two modalities.

47. The method of claim 41, comprising posting the converted medical image data to a medical image database.

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48. The method of claim 41, comprising, in response to a user input, selecting at least one of a plurality of medical images.

49. The method of claim 48, comprising displaying the one medical
25 image at a browser.

50. The method of claim 41, comprising:

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displaying the converted image to a first user at a first location;
and

simultaneously displaying the converted image to a second user at a second location different from the first location.

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51. A method of managing medical images comprising:
 - pulling a first image data having a first data format from a first scanner;
 - pulling a second image data having a second data format,

10 different from the first data format, from a second scanner; and

 - converting the first and second image data having the first and second data formats to a browser compatible data format.

52. A method of claim 51 comprising displaying at a user selected browser the first and second image data after the image data had been converted to the browser compatible format, whereby medical image data from two different image formats may both be displayed at an arbitrary browser.

20 53. A method of managing medical images for storage in a data base comprising:

- determining a region of diagnostic interest of a medical image;
- cropping the medical image to include the region of diagnostic interest and to reduce the data to be stored in the database; and

25 storing the cropped medical image in the database.

54. The method of claim 53 comprising adjusting image quality based upon the region of diagnostic interest.

55. The method of claim 54, wherein the adjusting comprises
5 scaling the image according to a standard Internet compatible format.

56. An Internet address data format for accessing a database comprising medical images corresponding to a plurality of modalities from a plurality of scan dates and associated with a plurality of patients, wherein
10 the images are stored in a browser compatible format and the address format comprises:

a patient identifier associated with each image;

a modality identifier associated with each image and positioned after the patient identifier; and

15 a scan date identifier associated with each image positioned
after the patient identifier, whereby a user at a browser may select a desired
image by entering an Internet address associated with the desired image.

57. The data format of claim 56, wherein the scan date identifier is
20 after the modality identifier.

58. The data format of claim 56, comprising a website identifier positioned before the patient identifier.

25 59. A medical image management system comprising:
a transfer engine for receiving medical image data from an
image data source;

a converter engine for converting medical image data to a browser compatible image format connected to receive medical image data from the transfer engine; and

5 a post engine for posting the browser compatible image to a database connected to receive converted image data.

60. The system of claim 59, wherein the converter engine comprises:

10 a decoder engine for extracting image pixel data from image data;

a physiologic knowledge engine for reducing the image pixel data without loss of diagnostic data connected to receive the extracted pixel data; and

15 an encoding engine for converting image pixel data to a browser compatible format connected to receive image pixel data, whereby image data may be converted to the browser compatible format without loss of diagnostic data.

61. The system of claim 59, comprising a server connected for 20 retrieving images from a database of browser compatible images in response to a user input.

62. The method of claim 1, comprising adjusting a movie frame rate based upon a priori knowledge.

63. The method of claim 62, wherein the a priori knowledge comprises physiological knowledge respectively associated with the medical images.

5 64. The method of claim 42, comprising setting a movie frame rate based on a diagnostic question.

65. The method of claim 42, comprising setting a movie frame rate based upon physiological information.

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66. A method of managing medical images, comprising:
retrieving from a database a plurality of medical images;
displaying the plurality of medical images on a web page; and
allowing a user to rearrange the display of the plurality of
15 medical images on the web page.

67. The method of claim 66 wherein a CGI program is used to rearrange the display of the plurality of medical images on the web page.

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68. The method of claim 66 comprising the step of displaying the rearranged medical images on a new web page.

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69. The method of claim 66 comprising the step of allowing a user to select a displayed image and designate a location on the web page at which the selected image is to be displayed when the display of the plurality of medical images is rearranged.

70. The method of claim 69 comprising the step of using an html image tag of the selected image when rearranging the display of the plurality of medical images.